

REMARKS

Claims 2, 6, and 25-32 remain pending in the above-identified application.

Applicant appreciates the courtesies extended during the telephonic interview conducted on November 21, 2005, between the Examiner and Applicant's undersigned attorney.

Claims 2, 6, 25, 26, and 29-31

Applicant respectfully requests reconsideration of the rejection of claims 2, 6, 25, 26, and 29-31 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,330,967 ("Milewski") in view of U.S. Patent No. 5,878,943 ("Nishikawa") and further in view of U.S. Patent No. 5,908,317 (Heo).

As an initial matter, during the November 21, 2005, interview mentioned above, the Examiner recognized that she may have misinterpreted Milewski with respect to the present claims. She asked Applicant to restate the remarks provided in Applicant's previous response (dated June 7, 2005) so she could reexamine the application and issue a new *non*-final Office action or a Notice of Allowance.

Each of claims 2, 6, 25, 26, and 29-31 recites solder bumps formed on the semiconductor chip, a resin film disposed on the semiconductor chip and *directly contacting* the solder bumps such that upper surfaces of the solder bumps protrude from the resin layer, a eutectic solder layer disposed on the cleaned upper surfaces of the solder bumps, **a plurality of lands formed on the mounting board**, and **a precoated solder layer disposed on the lands, wherein the eutectic solder layer of the solder bumps and the precoated solder layer join the upper surfaces of the solder bumps to the lands of the mounting board.**

Milewski discloses a process for connecting a circuit card 21 to an IC chip 10. Nishikawa discloses a method for removing an oxide or contaminated layer from the surface of a solder material or bonding pad. Heo discloses a method of forming chip bumps. Milewski, Nishikawa, and Heo, individually and in combination, fail to show or suggest "a plurality of lands formed on the mounting board" *and* "a precoated solder layer disposed on (the) lands." The Office action asserts the lands are represented by reference 53 and the pre-coated solder layers are represented by reference 51.

However, the "lands" 53 of Milewski are not lands, as claimed, but simply locations on the circuit card 21. These locations 53 on the circuit card are not "formed on" the mounting board as claimed. Further, the pads 51 of Milewski are not precoated solder layers. To the contrary, the pads 53 are "substantially free of...solder" (e.g., see column 4, line 47 - column 5, line 3). Because the Office action does not show "a plurality of lands formed on the mounting board," a *prima facie* case of obviousness has not been made. See M.P.E.P. § 2143.03.

Further, the references fail to show or suggest the eutectic solder layer of the solder bumps and the precoated solder layer join the upper surfaces of the solder bumps to the lands of the mounting board. Fig. 5 of Milewski shows an embodiment wherein the ball 35 is joined to the pad 51 by way of eutectic 39. Because the eutectic 39 is formed through the interaction of the cap 37 and ball 35 (e.g., see column 5, lines 25-27), the joint is not a result of a eutectic solder layer of the solder bump joining with a precoated solder layer, as claimed. Fig. 6 of Milewski shows an embodiment wherein the ball 35 is joined to the pad 51 by way of layer 48. In this embodiment, the layer 48 is used to join the ball to the pad "instead" of using a cap 37 (see column 5, line 64 to column 6, line 1). Thus, the embodiment of Fig. 6 also fails to show or suggest the eutectic solder layer of the solder bumps and the precoated solder layer join the upper surfaces of the solder bumps to the lands of the mounting board.

Yet further, Milewski *teaches away* from implementing a precoated land and a coated solder ball together, as the express purpose of Milewski is to obviate the need for both. Milewski clearly states the "pads 51 are substantially free of deposited solder alloy" and a coated solder ball is implemented *in lieu of* a coated pad. (column 4, line 47 - column 5, line 5). Substantiating Milewski's teaching away from using a pre-coated pad and a coated solder ball, together, another embodiment of the reference (shown in Fig. 6) discloses a coated land for use "*instead*" of a coated solder ball (see column 5, line 64 - column 6, line 1 (emphasis added)). Still another example of Milewski teaching away from using both a coated pad and a coated solder ball is at column 5, lines 37-40, which states, "[t]he SN-rich cap 37 serves as the Sn supply for eutectic formation, *thereby obviating the need for a Pb/Sn electroplate on the pads.*" (emphasis added). Thus, Milewski at least thrice clearly states that a coated solder ball *or* a coated pad

can be used, but not both. Milewski purposely obviates the need for both a coated solder ball and a coated pad, and thus teaches away from such use. Because Milewski teaches away from the use of a coated pad and a coated solder ball together, it is not reasonable to combine Milewski's teaching of a coated pad and a coated solder ball. See M.P.E.P. § 2141.02, stating, "(a) prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." (emphasis in original).

Further regarding claim 26, the references fail to show or suggest the eutectic solder layer of the solder bumps and the precoated solder layer intermix to join the upper surfaces of said solder bumps to the lands of said mounting board.

Further regarding claim 30, the references fail to show or suggest each land having a top side, a bottom side opposite the top side and directly contacting the mounting board, and side walls extending from the top side to the bottom side. The Office action, at page 4, lines 14-16, asserts that Milewski shows these features. However, the "lands" 53 of Milewski are simply a location on the circuit card 21, at certain locations on a top surface thereof. The lands 53 of Milewski are non-dimensional and do not have bottoms or sides. On the other hand, the lands of the present claim are clearly three-dimensional structures.

Further regarding claim 31, Milewski does not show or suggest the mounting board including an upper surface wherein the upper surface has land portions on which the lands are formed. The Office action asserts that the "lands" 53 (of Milewski) on the upper surface of the circuit card 21 are the lands of the present invention. However, the present claim recites that the mounting board has an upper surface having land portions on which the lands are formed. The "lands" 53 of Milewski cannot be formed on land portions of an upper surface because the "lands" 53 are themselves portions on the upper surface. And if the "lands" 53 of Milewski are considered the "land portions" of the present invention, which is the natural interpretation of Milewski, then pad 51 would correspond with the "land" of the claims. However, under this natural interpretation, there is still no precoated solder layer disposed on the lands, as claimed.

Because the references, individually and in any combination, fail to show or suggest all of the features of claims 2, 6, 25, 26, and 29-31 and the primary reference

teaches away from the claimed invention, the rejection is improper. Accordingly, Applicant respectfully requests the rejection of these claims be withdrawn.

Claim 27

Applicant respectfully requests reconsideration of the rejection of claim 27 under 35 U.S.C. § 103(a) as being unpatentable over Milewski, Nishikawa, and Heo and further in view of U.S. Patent No. 3,811,183 (Celling). Because claim 27 depends from claim 25, claim 27 is allowable for at least the same reasons identified above with respect to claim 25.

Claim 28

Applicant respectfully requests reconsideration of the rejection of claim 28 under 35 U.S.C. § 103(a) as being unpatentable over Milewski, Nishikawa, and Heo and further in view of U.S. Patent No. 6,168,972 (Wang).

As an initial matter, during the interview mentioned above, the Examiner confirmed that Wang does not qualify as prior art. She asked Applicant to restate the remarks provided in Applicant's June 7, 2005, response so she could reexamine the application without considering Wang and issue a new *non-final* Office action or a Notice of Allowance.

Because claim 28 depends from claim 25, claim 28 is allowable for at least the same reasons identified above with respect to claim 25. Further, Wang does not qualify as prior art. One of Applicant's foreign priority applications, Japanese Application No. P10-247393, filed on September 1, 1998, predates the effective priority date of Wang. Accordingly, Applicant respectfully requests the rejection of claim 28 be withdrawn.

Claim 32

Applicant respectfully requests reconsideration of the rejection of claim 32 under 35 U.S.C. § 103(a) as being unpatentable over Milewski, Nishikawa, and Heo and further in view of U.S. Patent No. 6,469,393 (Oya).

As an initial matter, during the interview mentioned above, the Examiner stated that Oya may not qualify as prior art. She asked Applicant to restate the remarks

provided in Applicant's June 7, 2005, response so she could examine whether Oya qualifies as prior art and submit a new *non-final* Office action or a Notice of Allowance.

Because claim 32 depends from claim 25 and 31, claim 32 is allowable for at least the same reasons identified above with respect to claims 25 and 31. Further, Oya does not qualify as prior art. One of Applicant's foreign priority applications, Japanese Application No. P10-247393, filed on September 1, 1998, predates the effective priority date of Oya. Accordingly, Applicant respectfully requests the rejection of claim 32 be withdrawn.

Conclusion

As it is believed that the application is in condition for allowance, a favorable action and a Notice of Allowance are respectfully requested.

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Respectfully submitted,



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